A Deſcription of an Invention, whereby the Diviſions of the Barometer may be enlarged in any given proportions; produced before the Royall Society by Mr. Robert Hook *R. S. Soc. and Profeſs. Geom.* Greſham.

SInce the diſcovery of the Alterations, that are in theſe parts of the World, in the weight of the *Atmoſphere*, by the means of the *Torricellian Tube*, there has been ſeveral contrivances thought on, to make the more minute variations in the Airs preſſure ſenſible.

And firſt, the Wheel-*Barometer* was invented and Publiſhed by Mr. *Hook*, Anno 1665, in his *Micrography*: (where it is deſcribed at large) but this did not anſwer fully the deſigned exactneſs, both for that the Mercury being apt to ſtick againſt the ſides of the Glaſs, would riſe and fall *per ſaltum*, all at once, and becauſe it is very difficult to adjuſt the Ball and Thread and other *apparatus* of this Inſtrument, as alſo that it is exceeding apt to be out of order, for which reaſon it is at preſent almoſt wholly laid aſide.

Upon this in *June* 1668 (as appears on the Journal of the Royal Society) he bethought himſelf of an other device to do the ſame thing, which was to encreaſe the diviſions by putting coloured Spirit of Wine, or ſome other Liquor not capable of Freezing, on the Mercury, which Liquor was made to riſe as the Mercury fell, and fall as it roſe, in a narrow Cane, ſo as to make the utmoſt limits about two foot aſunder. This invention was afterwards in the Year 1673 Publiſhed in *France* by Mr. *Hubin*, who neatly performed the Glaſs-work; but the Cane being neceſſarily ſmall and apt to be obſtructed with bubbles, (whereby the intercourſe of the outward Air would be intercepted) and beſides the utmoſt limits of riſe and fall ſcarce reaching two foot and a half, Mr. *Hook* was not yet ſatisfied, till he had found out the means of increaſing the Diviſions of the *Barometer ad libitum*, by a way free from ſuch Objections, which finally he produced before the R. Society at their meeting on *Feb. 3d.* 1685 *ſt. vet.* The contrivance whereof is this.

Figure I. Tab. II. Repreſents the Glaſs of this *Baroſcope*: the Cylinder A may be of what Diameter you pleaſe, the bigger the better, but it need not be above 2 inches long, the Cane AD muſt be ſo long, that the upper part of the Cylinder B may be 29 inches + ſuch a part of the hight of the other Cane BC, as the weight or ſpecifick Gravity of the Liquor that is to fill that Cane is to the ſpecifick Gravity of Mercury below the line *a b* in the Cylinder A. The third Cylinder C may be as high as you pleaſe above the Cylinder B, but is moſt conveniently made, ſo as the ſquare of the Diameter of the Cane BC be to the ſquare of the Diameter of the Cylinders B or C, (which muſt be exactly equall) as the riſe of the Mercury in the Cylinder B, is to the whole Length of the Cane BC: for in this caſe there will be nothing Superfluous, but the diviſions enlarged to the utmoſt advantage.

As to the method of filling this *Baroſcope*, though the Inventor hath not yet declared his own contrivance for the doing it, yet it will not be unneceſſary to ſhew here how it may be done. One way, (and the beſt that occurs at preſent) is to leave a ſmall hole at the top of the Cylinder A, and another near the top of the Cylinder B: this latter being well ſtopt, pour in as much Mercury, at the other hole in A, as ſhall fill both Canes as high as the Level of the ſaid hole; which done, ſtop either by Hermetically ſealing it, or elſe by a drop of ſeal-wax (the glaſs being firſt ground rough to make it ſtick) the hole in A; then opening the hole in B, draw off as much of the Mercury of the Cane B C till it will runn no longer: which done, ſtopp firmly the hole in B (which may be done as you pleaſe, there being no preſſure againſt you) and you will have the Cylinder A evacuated of Air for your purpoſe; and the hight of the Mercury will be as is uſual in the ordinary plaine and Wheel-*Barometers*.

Then pour into the Cane B C as much Spirit of Wine tinged with *Cochineele*, and Oyle of *Turpentine*, equal parts of each, as ſhall ſtand above the ſurface of the Mercury ſo many feet as you make the enlarged ſcale of your Barometer, or as is between the middle of the Cylinders B and C, and you will find the Mercury ſink in the Cane B C, and riſe in the other Cane A D, in ſuch proportion, that each 13 foot of Oyle and Spirit, will raiſe the Mercury ten Inches: This done, you muſt pour on, by the Cane B C, ſo much Mercury as may fill up the Cylinders A & B to ſuch hights, conſidering the preſent weight of the Atmoſphere, that the ſurface of the Mercury in both, may, at the utmoſt limits, (which have not in *England* been found to exceed 30, 6 and 28, 6. Inches) always fall within the bodies of the Cylinders, and never enter into the Canes.

Here note that theſe Liquors are choſen upon two accounts, Firſt they are exceeding near of a weight, and Spirit of Wine highly rectified is ſomewhat lighter than Oyle of Turpentine, but by a very ſmall addition of Phlegme or Water, the Spirit will præponderate and be undermoſt; ſo that you may make them as near of a weight as you pleaſe, and conſequently a Cylinder of the Oyle inſenſibly differing from an equal Cylinder of the Spirit of Wine. Secondly they are Liquors that will not mix; ſo that the Oyle of Turpentine ſwiming on the top, will be divided by a line only from the tinged Spirit of Wine, which the Oyle will keep from Evaporating.

The effect of this Baroſcope will be, that when the Atmoſphere is heavy, and the Mercury raiſed high in the Cylinder A, and retired out of B, the ſpirit of Wine will deſcend into the Cylinder B, and the Oyle of Turpentine will fill the Cane, ſo as to make the partition of the two Liquors near the Cylinder B. But on the contrary when the Air is light, the Mercury will ſink in A and riſe in B, ſo as to drive the Spirit of Wine into the Cane, and the Oyle of Turpentine into the Cylinder C, ſo that the ſection of the 2 Liquors will be near C, and the Variation of the hight of the Mercury will be enalarged into almoſt the length of the Cane, without that the Counter-preſſure from the Liquors will be in the leaſt altered, the hight and weight of the incumbent Cylinders being always the ſame.

That little alteration that may happen by the dilatation and contraction of the Spirit of Wine by heat and cold, which ought to be accounted for, may be beſt diſcovered by a Thermometer hanging by it (containing the ſame quantity of Spirit of Wine, and whoſe Cane is, as near as may be, of the ſame Diameter with the Cane BC in the Barometer) whoſe deſcent and aſcent muſt be added and ſubſtracted to reduce it to a rigorous exactneſs; but it is ſtill worth while to enquire if the Mercury it ſelf do not ſhrink and ſwell with cold and heat, ſo as not to need this correction.

Thus is a remedy found out for the defects and inconveniences of the Barometers hitherto produced, and an Inſtrument diſcovered which like a new Sence, will moſt nicely ſhew thoſe alterations in the Air, which without it would by no means be perceptible, and of which undoubtedly very great uſes might be made in order towards a perfect *Meteorologie*, which, without ſome ſuch help as this, can hardly arrive at any great point of certainty.

But I forbear to ſay more about it, leaſt (by omiſſion of ſome material circumſtance) I ſhould prejudice the Ingenious Author of this diſcovery, who has promiſed to publiſh a more particular Account thereof; what is here ſaid being only intended to aſſert the Right of the firſt Invention of this Uſeful and Subtile Inſtrument to its proper Author, from the pretenſions of all others.

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Tab. II

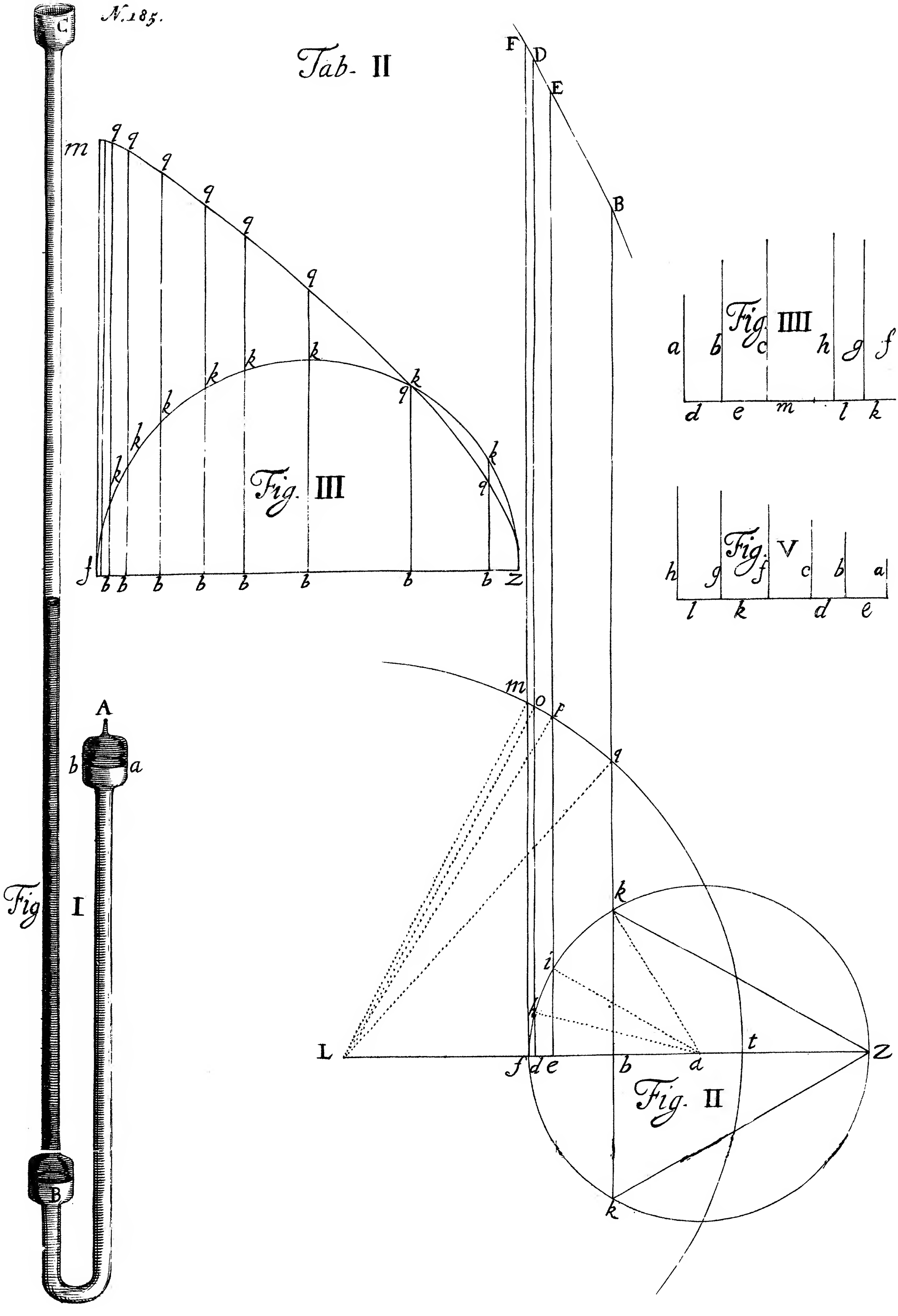
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Fig I
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Fig. III
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Fig. II
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